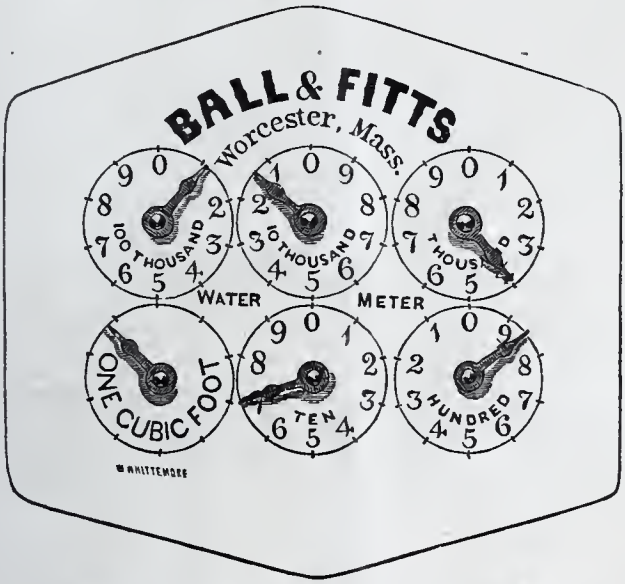
Catalogue

AND

PRICE LIST

OF THE



Union Water Meter Company

31 & 33 Hermon St.,

WORCESTER, MASS.

Manufacturers of

Water Meters, Valves, Steam Gongs, Steam Pressure,

Damper and Water Regulators, &c.

Tyler & Seagrave, Printers, 442 Main Street, Worcester.

1873

Illustrated Catalogue.

Catalogue

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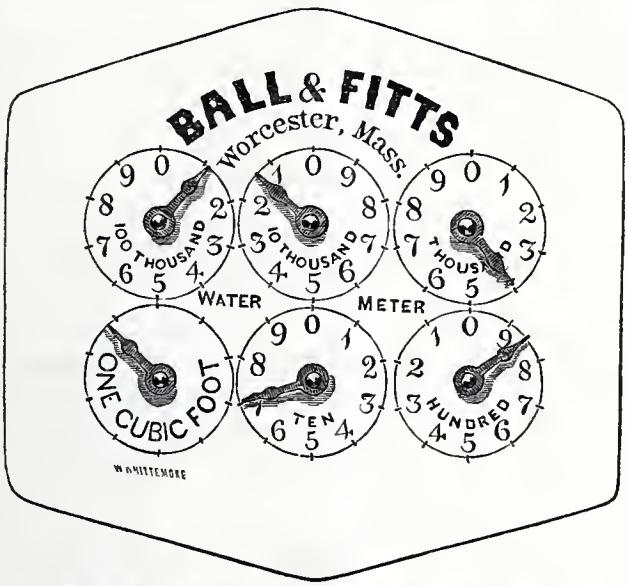


Union Water Meter Company

31 & 33 Hermon St.,

WORCESTER, MASS.

Manufacturers of

Water Meters, Valves, Steam Gongs, Steam Pressure,

Damper and Water Regulators,

And all Materials and Tools for Tapping Wrought Iron Cement Lined Water Pipe.

Union Water Meter Company,

ORGANIZED NOV. 9, 1868.

PRESIDENT,

PHINEHAS BALL.

TREASURER,

JOHN C. OTIS.

Mechanical Engineer,

BENAIAH FITTS.

Master Mechanic,

A. E. WILSON.

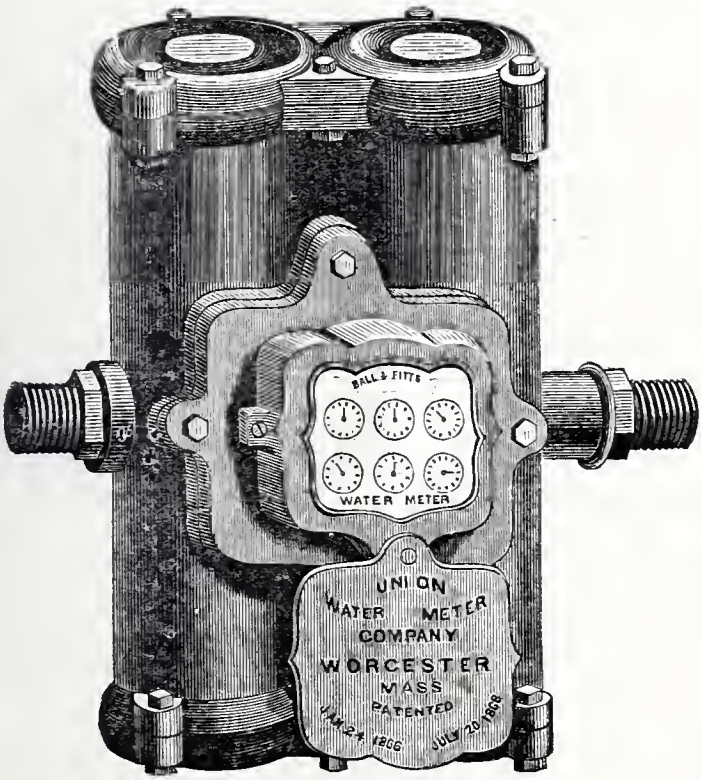
Union Water Meter Company,

WORCESTER, MASS.,

Manufacturers of

BALL & FITTS' WATER METERS.

PHINEHAS BALL, BENAIAH FITTS, } PATENTEES.



THIS METER

Is a Single-valved Double-acting Piston Meter. The three smaller sizes are made of brass; the larger ones of cast iron lined with brass.

There are now (Jan. 1, 1873,) about 1300 in use, in the following and other cities :

Charlestown, Mass.,	Canton, Ohio,
Cambridge, "	Erie, Pa.,
Springfield, "	Indianapolis, Ind.,
Worcester, "	Washington, D. C.,
Concord, N. H.,	Jackson, Mich.,
Rockland, Me.,	Medford, Mass.,
Norwich, Conn.,	New Bedford, Mass.,
Meriden, "	Fitchburg, Mass.,
Watertown, N. Y.,	Burlington. Vt.,
Providence, R. I.,	Norwalk, Conn.,
Cincinnati, O.,	Covington, Ky.,
Louisville, Ky.,	Kalamazoo, Mich.
Columbus, Ohio,	

Many other cities and water companies are also testing them for adoption.

In setting the Meter, place it upon its bed with the register directly up, (Fig. 1,) connecting the pipe with the nipple marked "inlet," by

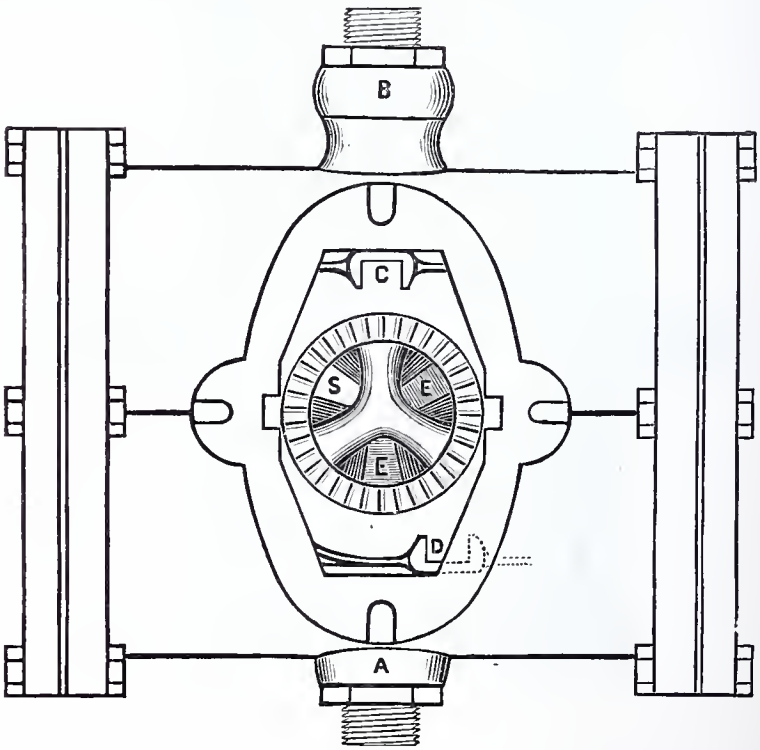


Fig 1.

letters upon the casting, and the outlet to the opposite one. The water

is admitted over the top of the valve, and in filling and leaving is passed twiee through it. The full pressure of the main upon the top of the valve is obviated, as there are always two ports filling and two ports discharging at the same time, making a constant opening equal to one full port on each side of it all of the time. This arrangement very nearly balances the valve so that its pressure upon its seat is not much over that of its own weight. A valve taken from a Meter which had been run one year, was found not to have worn away enough to erase a small mark made with the point of a knife upon the ground surface of it when it was new.

To put the meter together and set the valve when it has been taken apart for any cause, place the meter before you in the position shown, Fig. 1, that is, with the inlet pipe A toward you, put the valve into its seat and turn it so that the upper left hand port S will be exaetly open, and the other two E E will be closed as shown.

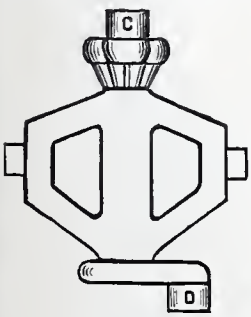


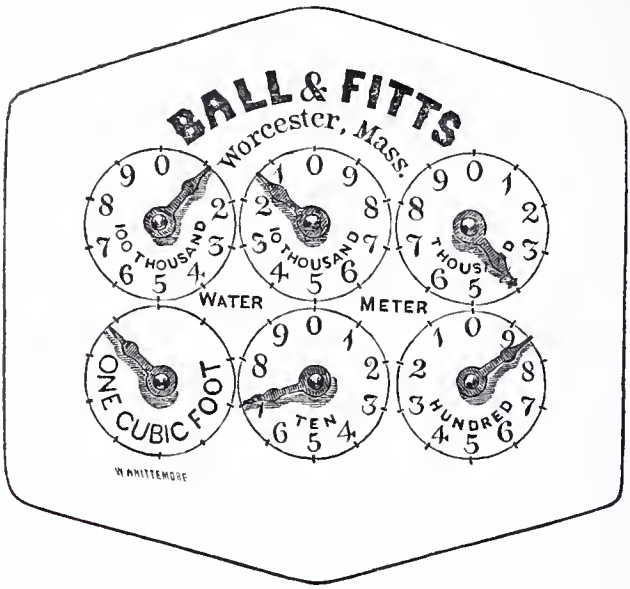
Fig. 2.

Move the upper slide or piston C to the center of the meter, and the lower slide D to the right, as shown, then take the shaft stand, Fig. 2, hold it in the position as shown, the gear from you, the crank C directly up and the crank D off to the right, holding it in the position, drop it into its place.

The reading of the Register is taken upon the same principle as that of the ordinary gas meter.

The first cut on the next page, represents the face of the Register.

For the first three sizes, 5-8 in., 3-4 in. and 1 in. the Register counts up to 100,000 cubic feet, and those above one inch to 1,000,000 cubic feet. By inspection of the cut, its principle will be readily understood. The lower left hand circle represents 1 cubic foot; the lower middle, 10; the lower right hand, 100; upper right hand corner, 1000; the middle upper, 10,000; the upper left hand, 100,000. The Register now reads as the pointers stand, 11,387 cubic feet, omitting the $\frac{12}{100}$ of a cubic foot represented on the first circle. The larger Meters read in the same manner, only the first circle commences at 10 cubic feet instead of 1. With a little practice and care the Register can be readily and accurately read.



PRICE LIST.

Size of Meter.	No. of Meter.	Gallons of water delivered by Meter per working day of 10 hours.	Price.	Boxing.
$\frac{5}{8}$	1	2,000	$23.00	50 cts. for No. 1.
$\frac{3}{4}$	2	4,000	34.00	50 cts. for No. 2.
1	3	8,000	45.00	50 cts. for No. 3.
$1\frac{1}{2}$	4	11,000	80.00	$1 00 for No. 4.
2	5	34,000	135.00	2 50 for No. 5.
3	6	64,000	275.00	3 50 for No. 6.
4	7	150,000	450.00	5 00 for No. 7.

Parties visiting New York can see and examine it by calling upon McREE SWIFT, Engineer and Superintendent of the Patent Water and Gas Pipe Co., Office, 91 Liberty Street.

The gallons of water given per day is the amount of actual work as an average which is considered the most economical use for the life of the Meter. Although under emergencies and under high heads the Meters will double this amount of delivery.

TABLE No. 1.

Table No. 1 gives the pressure of water in pounds per square inch for every foot in height to 300 feet; and then by intervals, to 1000 feet head. By this table, from the pounds pressure per square inch, the feet head is readily obtained; and *vice versa.*

Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.
1	0.43	49	21.22	97	42.01	145	62.81	193	83.60
2	0.86	50	21.65	98	42.45	146	63.24	194	84.03
3	1.29	51	22.09	99	42.88	147	63.67	195	84.46
4	1.73	52	22.52	100	43.31	148	64.10	196	84.90
5	2.16	53	22.95	101	43.75	149	64.54	197	85.33
6	2.59	54	23.39	102	44.18	150	64.97	198	85.76
7	3.03	55	23.82	103	44.61	151	65.40	199	86.20
8	3.46	56	24.25	104	45.05	152	65.84	200	86.63
9	3.89	57	24.69	105	45.48	153	66.27	201	87.07
10	4.33	58	25.12	106	45.91	154	66.70	202	87.50
11	4.76	59	25.55	107	46.34	155	67.14	203	87.93
12	5.19	60	25.99	108	46.78	156	67.57	204	88.36
13	5.63	61	26.42	109	47.21	157	68.00	205	88.80
14	6.06	62	26.85	110	47.64	158	68.43	206	89.23
15	6.49	63	27.29	111	48.08	159	68.87	207	89.66
16	6 92	64	27.72	112	48.51	160	69.31	208	90.10
17	7.36	65	28.15	113	48.94	161	69.74	209	90.53
18	7.79	66	28.58	114	49.38	162	70.17	210	90.96
19	8.22	67	29.02	115	49.81	163	70.60	211	91.39
20	8.66	68	29.45	116	50.24	164	71.04	212	91.83
21	9.09	69	29.88	117	50.68	165	71.47	213	92.26
22	9.52	70	30.32	118	51.11	166	71.90	214	92.69
23	9.96	71	30.75	119	51.54	167	72.34	215	93.13
24	10.39	72	31.18	120	51.98	168	72.77	216	93.56
25	10.82	73	31.62	121	52.41	169	73.20	217	93.99
26	11.26	74	32.05	122	52.84	170	73.64	218	94.43
27	11.69	75	32.48	123	53.28	171	74.07	219	94.86
28	12.12	76	32.92	124	53.71	172	74.50	220	95.30
29	12.55	77	33.35	125	54.14	173	74.93	221	95.73
30	12.99	78	33.78	126	54.58	174	75.37	222	96.16
31	13.42	79	34.21	127	55.01	175	75.80	223	96.59
32	13.86	80	34.65	128	55.44	176	76.23	224	97.03
33	14.29	81	35.08	129	55.87	177	76.67	225	97.46
34	14.72	82	35.52	130	56.31	178	77.10	226	97.89
35	15.16	83	35.95	131	56.74	179	77.53	227	98.33
36	15.59	84	36.38	132	57.18	180	77.97	228	98.76
37	16.02	85	36.82	133	57.61	181	78.40	229	99.19
38	16.45	86	37.25	134	58.04	182	78.84	230	99.63
39	16.89	87	37.68	135	58.48	183	79.27	231	100.06
40	17.32	88	38.11	136	58.91	184	79.70	232	100.49
41	17.75	89	38.55	137	59.34	185	80.13	233	100.92
42	18.19	90	38.98	138	59.77	186	80.57	234	101.36
43	18.62	91	39.42	139	60.21	187	81.00	235	101.79
44	19.05	92	39.85	140	60.64	188	81.43	236	102.22
45	19.49	93	40.28	141	61.07	189	81.87	237	102.66
46	19.92	94	40.71	142	61.51	190	82.30	238	103.09
47	20.35	95	41.15	143	61.94	191	82.73	239	103.52
48	20.79	96	41.58	144	62.37	192	83.17	240	103.96

Table No. 1 Continued.

Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.	Feet Head.	Pressure per square inch.
241	104.39	257	111.32	273	118.26	289	125.18	350	151.61
242	104.83	258	111.75	274	118.69	290	125.62	360	155.94
243	105.26	259	112.19	275	119.12	291	126.05	370	160.27
244	105.69	260	112.62	276	119.55	292	126.48	380	164.61
245	106.13	261	113.06	277	119.99	293	126.91	390	168.94
246	106.56	262	113.49	278	120.42	294	127.35	400	173.27
247	106.99	263	113.92	279	120.85	295	127.78	500	216.59
248	107.42	264	114.36	280	121.29	296	128.21	600	259.91
249	107.86	265	114.79	281	121.72	297	128.65	700	303.23
250	108.29	266	115.22	282	122.15	298	129.08	800	346.55
251	108.72	267	115.66	283	122.58	299	129.51	900	389.87
252	109.16	268	116.09	284	123.01	300	129.95	1000	433.18
253	109.59	269	116.52	285	123.45	310	134.28		
254	110.02	270	116.96	286	123.88	320	138.62		
255	110.46	271	117.39	287	124.31	330	142.95		
256	110.89	272	117.82	288	124.75	340	147.28		

Pressure of Water in Pipes.

TABLE No. 2.

Table No. 2 gives the internal pressure in pounds for each inch in length of Pipe when subjected to the strain of a column of water as specified in the heading.

Diam. Pipe in inches.	Circum. in inches. 1 pound per inch.	5 lbs. pressure per sq. in. 11 1-2 feet Head.	10 lbs. pressure per square in. 23.1 ft. Head.	20 lbs pressure per square in. 46.1 ft. Head.	30 lbs. pressure per square in. 69.3 ft. Head.	40 lbs. pressure per square in. 92.5 ft. Head.	50 lbs pressure per sq in. 115 ft. Head.	100 lbs. pressure per square in. 231 feet Head.	150 lbs. pressure per square in. 346 feet Head.	200 lbs. pressure per square in. 472 feet Head.	250 lbs. pressure per square in. 579 feet Head.	300 lbs. pressure per square in. 693 feet Head.
2	6.28	31.4	62.8	125.6	188.4	251.2	314	628	942	1,256	1,570	1,884
3	9.42	47.1	94.2	188.8	282.6	377.6	471	942	1,413	1,888	2,355	2,826
4	12.56	62.8	125.6	251.2	376.8	502.4	628	1,256	1,884	2,512	3,140	3,768
6	18.84	94.2	188.4	376.8	565 2	753.7	942	1,884	2,826	3,768	4,710	5,652
8	25.13	125.6	251.3	502.6	753.9	1005.2	1256	2,513	3,768	5,026	7,280	7,539
10	31.41	157.0	314.1	628.2	942.3	1256.4	1570	3,141	4,710	6,282	7,880	9,423
12	37.69	188.4	376.9	753.8	1130.7	1507.6	1884	3,769	5,652	7,538	9,420	11,307
16	50.26	251.3	502.6	1005.2	1507.8	2010.4	2513	5,026	7,539	10,052	12,565	15,078
18	56.54	282.7	565.4	1130.8	1696.2	2261.6	2827	5,654	8,481	11,308	14,135	16,962
20	62.83	314.1	628.3	1256.6	1884.9	2513.2	3141	6,283	9,423	12,566	15,705	18,849
24	75.39	376.9	753.9	1507.8	2261.7	3015.6	3769	7,539	11,307	15,078	18,845	22,617
30	94.24	471.2	942.4	1884.8	2827.2	3769.6	4712	9,424	14,136	18,848	23,560	28,372
36	113.09	565.4	1130.9	2261.8	3392.7	4523.6	5654	11,309	16,962	22,618	28,270	33,927
42	131.94	659.7	1319.4	2638.8	3958.2	5277.6	6597	13,194	19,791	26,388	32,985	39,582
48	150.79	753.9	1507.9	3015.8	4523.7	6031.6	7539	15,079	22,617	30,158	37,695	44,237

Value of Water.

Metered water is sold in all cities at a specified rate for the thousand gallons.

TABLE No. 3.

Value of one million gallons at prices per thousand gallons as named in the left hand column, and also the value of one million gallons per day, per year of 365 days.

Price per 1000 gallons	Value of one million gallons.	Value of one million gallons per day for one year of 365 days.
5 cents.	$50 00	$18,250
10 "	100 00	36,500
15 "	150 00	54,750
20 "	200 00	73,000
25 "	250 00	91,250
30 "	300 00	109,500
40 "	400 00	146,000

Cost to Deliver Water.

Water as it runs in the river, or exists in the pond or lake, is free, and once on their banks it costs us nothing only the taking, for a supply adequate to our wants. But for our supply by an aqueduct, as a dweller in a city, it costs something of the savings of a community, called capital, to furnish us this prime necessity. This is illustrated by the annexed tabular statement drawn from various reports on water. The cost per million gallons to deliver water in cities includes interest on cost of works and maintenance.

TABLE No. 4.

Date.	Cities.	Cost per million gallons.	Cost per 1000 gallons.
1871	Worcester, Mass.,	$74 17	$7.\frac{417}{1000}$ cents.
1871	Chicago, Ill.,	62 74	$6.\frac{274}{1000}$ "
1871	Dayton, Ohio,	218 23	$21.\frac{823}{1000}$ "
1871	Cambridge, Mass.,	116 78	$11.\frac{678}{1000}$ "
1870	Detrot, Mich.,	44 74	$4.\frac{474}{1000}$ "
1871	Detroit, Mich.,	40 61	$4.\frac{61}{1000}$ "

Gallons of Supply per fixed Rate.

This Table gives the number of gallons of water which a consumer is entitled to use daily for 365 days, or one year, for each dollar of rates paid at the sum per 1000 gallons as stated in the heading.

TABLE No. 5.

Rate paid per annum.	5 cents per 1000 gallons.	10 cents per 1000 gallons.	15 cents per 1000 gallons.	20 cents per 1000 gallons.	25 cents per 1000 gallons.	30 cents per 1000 gallons.	40 cents per 1000 gallons.	50 cents per 1000 gallons.
1	54.8	27.4	18.2	13.7	10.9	9.1	6.8	5.5
2	109.6	54.8	36.5	27.4	21.9	18.2	13.7	10.9
3	164.4	82.2	54.7	41.1	32.8	27.4	20.5	16.4
4	219.2	109.6	73.0	54.8	43.8	36.5	27.4	21.9
5	274.0	137.0	91.3	68.5	54.8	45.6	34.2	27.4
6	328.8	164.4	109.6	82.2	65.7	54.8	41.1	32.8
7	383.6	191.8	127.8	95.9	76.7	63.9	47.9	38.3
8	438.4	219.2	146.1	109.6	87.6	73.0	54.8	43.8
9	493.1	246.6	164.4	123.3	98.6	82.2	61.6	49.3
10	547.9	273.9	182.6	136.9	109.6	91.3	68.4	54.8
20	1096.	548	365.	274	219	182.	137	109.6
30	1644.	822	548.	411	329.	274.	205.	164.4
40	2192.	1096	730.	548	438.	365.	274.	219.2
50	2740.	1370	913.	685	548	456	342	274.0
60	3288.	1644.	1096.	822	657	548	411.	328.7
70	3836.	1918.	1278.	959.	767	639	479.	383.5
80	4383.	2191.	1461.	1095.	876	730	549.	438.3
90	4931.	2465.	1643.	1232.	986	821	616	493.1
100	5479.	2739.	1826.	1369.	1095	913	684	547.9
200	10.959	5479	3653	2739	2191	1826	1369	1095.8
300	16.438	8219	5479	4109	3287	2739	2054	1643.8
400	21.918	10.959	7306	5479	4383	3653	2739	2191.7
500	27.397	13.698	9132	6849	5479	4566	3424	2739.7
600	32.876	16.438	10.958	8219	6575	5479	4109	3287.6
700	38.356	19.178	12.785	9.589	7671	6397	4794	3835.6
800	43.835	21.967	14.611	10.983	8767	7305	5491	4383.5
900	49.315	24.657	16.438	12.328	9863	8219	6164	4931.5
1000	54.794	27.397	18.264	13.698	10.959	9132	6849	5479.4

Waste of Water.

Waste of water by consumers is a great evil upon all water works. The subjoined tabular statement illustrates, to some extent, its prevalence.

TABLE No. 6.

Water Works at	Date of Report.	Gallons of water furnished per day.	Reported income from the sale of water.	Rate per 1000 gallons at which metered water is sold.	Income estimated at rate for which metered water is sold, deducting 10 per cent. for necessary waste.	Income received from each 1000 gallons furnished.
Boston,	1869	15,070,400	629,451.48	30 cents	1,485,188.00	11c. 4 mills
Cambridge,	1869	1,617,481	76,149.30	30 "	157,602.00	12c. 8 "
Charleston,	1869	2,354,974	102,878.09	30 "	232,082.74	11c. 8 "
Brooklyn,	1869	17,630,400	578,451.15	20 "	1,158,317.28	8c. 9 "
Philadelphia,	1869	34,040,409	702,469.29	No meters used.		5c. 6 "

Consumption of Water.

Gallons of water per day required for each inhabitant collected from various reports on water.

TABLE No. 7.

City.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
Boston, Mass,	.....	.....	.....	.....	.....	.....	60	.....
Charlestown, Mass.,	.....	.....	.....	41.83	.....	.....	.....	.....
Cambridge, Mass.,	.....	.....	.....	.....	.....	.....	43.89	43
Cleveland, Ohio,	21 68	21.80	22.35	23.85	24.77	27.36	30.86	35.68
New York,	62.00	.....	.....	.....	.....	.....	.....	.....
Louisville, Ky.,	.....	.....	16.81	.....	.....	.....	28.00	.....
Philadelphia,	.....	.....	.....	.....	.....	50.00	.....	.....
Detroit, Mich.,	.....	.....	.....	48.46	.....	.....	64 93	.....
Wilmington, Del.,	.....	.....	.....	.....	.....	.....	.....	47
Newark, N. J.,	.....	.....	.....	.....	.....	.....	26.22	.....
Jersey City,	.....	.....	.....	.....	.....	.....	73.65	.....
St. Louis, Mo.,	.....	.....	.....	.....	.....	.....	54.	.....
Baltimore, Md., Aug. 1870,	.....	.....	.....	.....	.....	.....	42.26	.....
Chicago, Ill.,	.....	.....	.....	.....	.....	.....	72.50	.....

METERED RATES.

The rates charged for measured water and the regulations controlling them vary in the several cities in which they are used.

The city of Providence, R. I., adopted in Jan'y, 1872, the following regulation, permitting a consumer to elect whether he would pay by meter or by the ordinary mode of rating, to wit:

"For measured or estimated water per 100 gallons, three cents."

METERS.

"When a consumer shall prefer to pay the cost of such a meter as shall be approved by the Commissioners, together with the cost of putting in and of maintenance, rather than to pay schedule rates, or for the quantity estimated, a meter will be put in, provided, however, that in no case where a meter is used shall the annual charge be less than $10.00. The Commissioners reserve the right to put in a meter at the cost of the City, in any case, and charge for measured water, instead of being governed by the above schedule."

In 1872, the city of Worcester, Mass., adopted the following, to wit:

"SECTION 7.

Metered Water.—Where the quantity of water used is determined by meter, the assessment per 1000 gallons shall be at the following rates:

For 1000 gallons per day, or less, the sum of twenty-five cents per 1000 gallons.

For 1000 to 5000 gallons per day the sum of twenty cents per 1000 gallons.

For from 5000 to 15,000 gallons per day the sum of fifteen cents per 1000 gallons.

For all amounts to any single consumer over 15,000 gallons per day, at such special rates as may be fixed by contract with the Joint Standing Committee on Water, provided no such contract shall be made to extend over one year from the date thereof.

The City will set meters upon any premises where the Joint Standing Committee on Water determines so to do; and all premises where the meters are set the owner of the premises will be held thereafter to pay the rate according to the foregoing schedule for the entire amount of water used upon such estate, irrespective of all under leases, or any individual consumer or individual consumers, upon such estates. Whenever a consumer shall prefer to pay the cost of such meter as shall be approved and set by the Joint Standing Committee on Water, together with the cost of the setting thereof and its maintenance thereafter, he shall pay rates thereafter by the foregoing schedule.

All meters set on private estates shall be subject to the inspection and control of the Water Commissioner, or such agent or officer as the Committee on Water shall designate to have the care and supervision of meters.

The officer whose duty it is to care for the meters in the City, or his agent, shall have free access at all times upon the premises of the owner thereof for the purpose of reading the meter, or he may remove a meter at any time for the purpose of testing the accuracy of its measurement, and when any meter shall be found incorrect in measurement, and unworthy further use, such meter so condemned will be replaced at once by one which is approved by the Committee on Water at the expense of the owner thereof.

Whenever any consumer selects to pay rate by meter, he shall ever after be held to pay rate thereby, until released therefrom by the Joint Standing Committee on Water.

Where the rate to any single consumer by any mode of assessment is over fifty dollars per annum, the Committee on Water may set on such estate a meter at the expense of the city.

The rate by meter measurement in all cases where they are used shall take precedence of all other modes of rating named in this Ordinance.

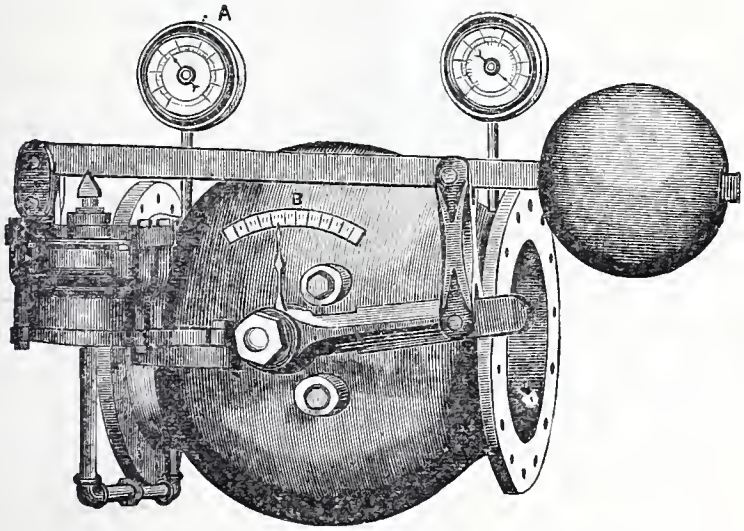
No meter will be allowed to be set or used on the Water Works, unless approved by the Joint Standing Committee on Water.

SECTION 8.

Used by the City.—Water supplied to the various departments of the city shall be assessed at the rate of fifteen cents per 1000 gallons, the amount to be charged to the Department so supplied.

Hydrants.—Hydrants set by the city shall be assessed twenty-five dollars each, but hydrants and fixtures set and maintained by individuals at their own expense, for the protection of their own property against fire only shall not be assessed."

Water Pressure Regulator.

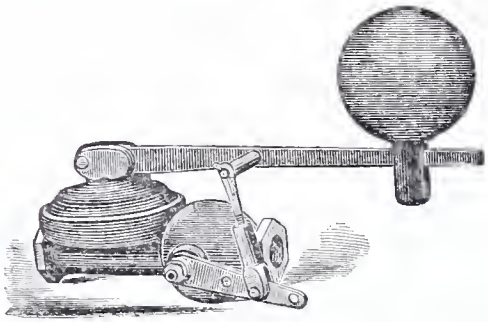


This is an apparatus for reducing and regulating the pressure in any system of water works between what may be termed a High and Low Service. A ten inch Regulator has been placed on the Worcester Water Works between the recent high and low service main. On the high service side the pressure stands at 156 pounds 360 feet head, and on the low service side at 72 pounds 162 feet head. On the Worcester Water Works, at many elevated points in the city, the supply had become very deficient occasioned by loss of head in overdrawing on the original 16 inch main. This defect is overcome by the use of this valve. This valve is serviceable wherever the head wants to be broken either on a line of pipe or between a system of pipes. The one at Worcester is placed between the high service and the original distribution, through about 52 miles of pipe.

PRICE.

10 in.	with full attachments of guages, index, and telegraph alarm,					$500.00
8 in.	"	"	"	"	"	400.00
6 in.	"	"	"	"	"	250.00

Water Pressure Regulator for Service Pipes.

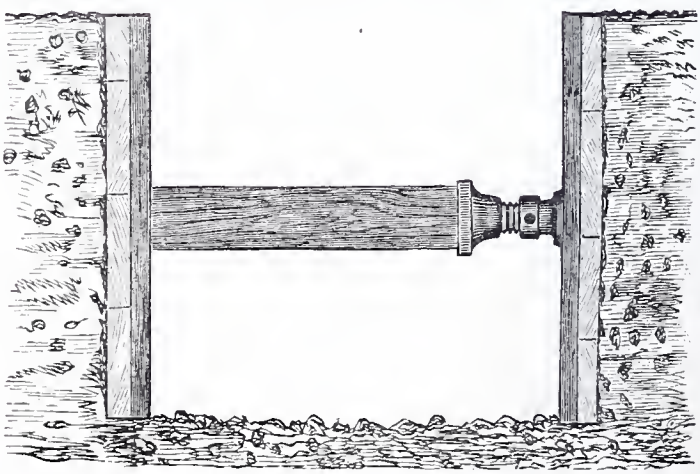


This can be adapted to reducing the pressure on the pipes to any desired point below that on the main.

PRICE.

½ inch,	$15.00	1½ inch,	60.00
¾ inch,	25.00	2 inch,	85.00
1 inch,	35.00		

Jack Screw for Bracing Deep Sewer and other Trenches.



This is placed on the end of a brace of any required length, and used between the side planking in place of the ordinary driving Brace.

PRICE for Screw without the woodwork, each, - - $3.00.

DRINKING FOUNTAIN,

For School-House Yards, Public Streets, &c.

Diameter of Bowl, 2 ft. 4 inches. Total Height 5 ft.

Price $75.00.

BALL'S IMPROVED METHOD OF TAPPING WROUGHT IRON, CEMENT-LINED,

OR OTHER

WATER PIPES.

Patented January 25, 1865.

The following cuts represent the method of its application. Fig. 1 is a cross section and Fig. 2 a front view.

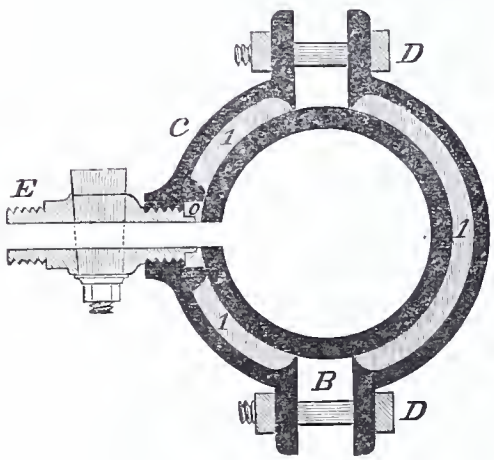


Fig. 1.

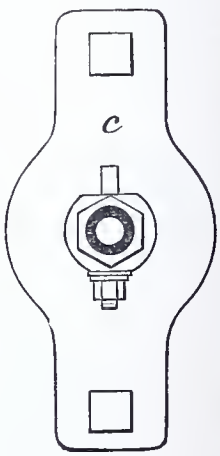


Fig. 2.

The tap E, Fig. 1, is made nearly in the usual form of all corporation stops, and is screwed firmly into a cast iron holder C. This holder or band is made to fit the outside diameter of the pipe to which it is applied. The corporation has a thin projecting ring over which a rubber packing is applied, as shown at O. This packing fits into a chamber made for it in the band C, and rests, when applied, directly upon the exterior of the iron of the pipe to be tapped. The stop holder is held firmly in place by means of bolts D, D, passing through a back band F, as shown by Fig. 1.

The underside of the bands are chambered out, and when put on are filled with Roman or Portland cement, as shown at 1, 1, 1, Fig. 1, in such manner as in no case to have iron come in contact with iron. Where the outer coating of cement on the pipe has become hardened, only so much of it is removed as is sufficient to admit the application of the band C. The band F, in such cases, is put on over the hardened covering, being grouted with cement mortar tightly to it. After the fixture has been firmly bolted to its place it is entirely covered with cement, taking especial care and pains to fill the underside at B, perfectly solid with fresh mortar.

In re-covering the iron, where the coating has been removed, every precaution should be taken to completely join and overlay all joints next the original cement, and to fill every portion compactly.

Stops may be applied in this manner as readily on empty pipe as on that under pressure, taking care only to bring the band firmly to joint.

This mode of tapping possesses the following advantages, to wit:

"1st. The stops being attached by a screw to a strong cast iron band fitting the exterior diameter of the main and then held in place by strong bolts, the whole fixture being covered with cement when finished, strengthens, rather than weakens the main to which it is applied.

2d. By this method, when faithfully applied, the portion of the main tapped becomes as permanent as any other section.

3d. It prevents any damage to the pipe by any external cause that brings any leverage strain upon the service at the corporation.

4th. It can be readily applied so as to radiate the service in any desired direction at right angles with the main.

5th. It is usually applied upon the side of the main, and in this position, the service will be from 6 to 12 inches lower from the surface of the street than when soldered upon the top in the ordinary method. This fact gives the service additional protection from injury by frost.

6th. When radiating from the side of the main, a covered stop box may be placed over it reaching to within a few inches of the surface of the street, and thus it may be made to supersede placing an additional stop or shut-off at the curbstone in the sidewalk.

7th. The cost does not vary materially from the method by soldering usually adopted.

8th. By proportioning the size of the front band to the end desired, stops from ½ inch to 2½ inches may be applied with equal facility and certainty.

9th. It is equally as useful upon cast iron pipe of thin shell and upon that which has become weakened by rust and age, as upon cement-lined wrought iron pipe."

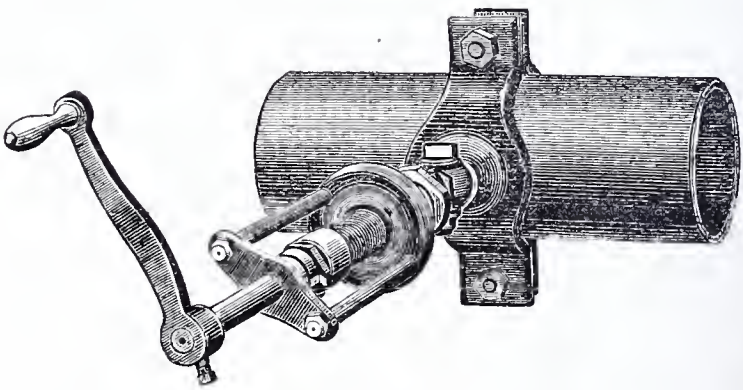
The exclusive right to use this improvement is owned by the "*Patent Water and Gas Pipe Co.*," *Office 91 Liberty St., New York City*, McREE SWIFT, President and Engineer.

These fixtures and taps are manufactured under the supervision of the Patentee.

PRICE LIST OF STOPS, BANDS, BOLTS, &c. COMPLETE.

	Pipe 2 to 6 in. diameter.	8 to 10 in. diameter.	12 to 16 in diameter.
½ inch Stops, - - -	$2 15	$2 40	$2 75
⅝ " - - - -	2 50	2 75	3 00
¾ " - - - -	3 25	3 50	4 00
1 " Ludlow Gate, -	6 00	6 50	7 00
1¼ " " " - -	8 00	8 50	9 00
1½ " " " - -	10 00	10 50	11 00
2 " " " - -	13 00	14 00	15 00

Hand Feed Drill for Tapping Cement Lined Water Pipes under Pressure.



The above cut represents the drill as attached to the stop fixed to the pipe as it is applied in actual use.

PRICE of Drill No. 1, including 4 from ½ in. to 1 inch Drills, $20 00
No. 2, for Drills from 1 inch to 3 inches with 3 Drills, 50 00

Service Pipe.

The attention of Water Companies is called to service pipe made of wrought iron gas pipe lined with cement.

One inch gas pipe can be lined readily, leaving a bore $\frac{3}{4}$ inch in diameter, and $1\frac{1}{4}$ inch lined, one inch bore. It is put together with the ordinary screw couplings in the usual manner of laying steam or gas pipes. The coupling is lined by means of an India rubber cone after the joints are coupled together, thus completely protecting the inside from oxidation. The attachment to the corporation is made with about one foot of lead pipe.

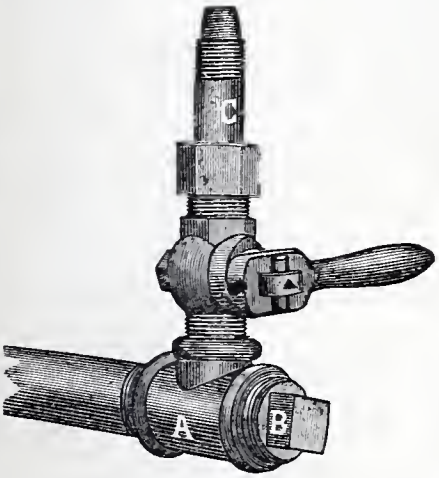


Fig. 3.

The waste stops are coupled to it with composition T's, as shown by Fig. 3, by which A represents the composition T, B the plug, and C the nipple to which the plumber attaches the supply. The nipple C is made with the usual taper end for the attachment of lead pipe by soldering. Below the taper end this nipple is furnished with a thread for the attachment of galvanized iron pipe. This arrangement of the waste stop is preferred because the removal of the plug B may be effected without any derangement to the apparatus, and by this means any obstructions in the service under the sidewalk or in the street may be very readily removed. By taking care to lay the service in a straight line from the supply main to the inside of the basement they may be readily thawed out when frozen by working a hot water pipe through the open end of this T. In the severe winter of 1868 one service pipe 90 feet in length was thawed out in this manner upon the Worcester Water Works.

The constant cutting of these pipes for the purpose of making the service of any desired length, has proved the certainty with which it can be lined, and the tenacity of the lining to keep its place when hardened.

This kind of service pipe has the following advantages: cheapness, durability, freedom from any poisonous influence upon the water, and almost entire exemption from any liability to breakage, or other injury occasioned by the constant excavations for drains, sewers, etc., being made in city and village streets.

This pipe is in use in the following cities and towns:

Worcester, Mass.,	Northampton, Mass.,
New Bedford, Mass.,	Keene, N. H.,
Lowell, Mass.,	Norwich, Conn.,
Fitchburg, Mass.,	Hartford, Conn.,
Springfield, Mass.,	Canton, Ohio.

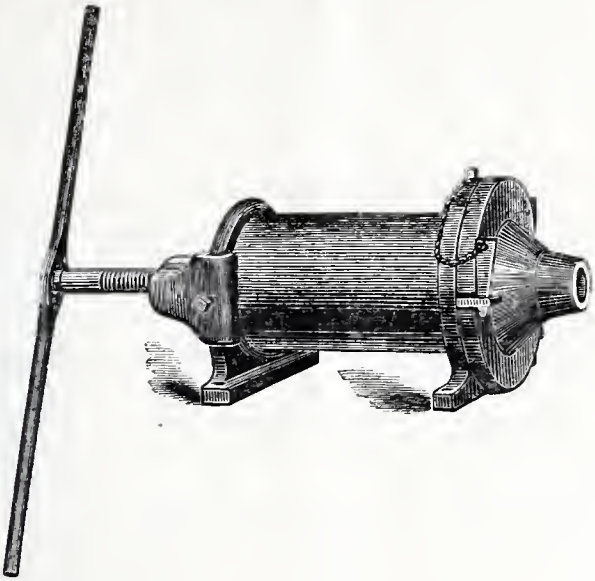
In the city of Worcester, since it was first introduced in 1868, there has been laid over 150,000 feet of this kind of service pipe.

PRICE LIST OF WASTES, STOPS, &c.

(Very Heavy and Best Composition.)

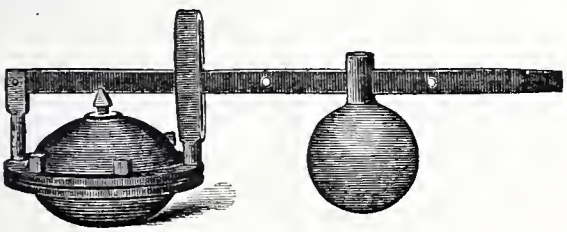
Sidewalk Stops, Screw End, $\frac{1}{2}$ inch,		1 40
" " " " $\frac{5}{8}$ "		1 70
" " " " $\frac{3}{4}$ "		2 50
Sidewalk Stops, Solder End, $\frac{1}{2}$ inch,		1 25
" " " " $\frac{5}{8}$ "		1 50
" " " " $\frac{3}{4}$ "		2 25
1 inch brass T's,		50
$1\frac{1}{4}$ " "		60
1 " Solder Nipples,		40
$1\frac{1}{4}$ " "		55
$\frac{1}{2}$ " Waste Stops, including couplings, each,		1 75
$\frac{5}{8}$ " " " " "		2 25
$\frac{3}{4}$ " " " " "		3 00

Press for filling Service Pipe in lining it.



PRICE, with 3 sets of Cones, - - - - - $65 00
" of Press with hydraulic cylinder attached for filling the pipe by the pressure of water from an aqueduct, 150 00

DAMPER REGULATOR FOR LOW PRESSURE BOILERS.



The above is a Damper Regulator for low pressure boilers, to be applied on dwellings, etc.

PRICE: - - - - - - - $5 00

B. FITTS' PATENT

GOVERNOR AND STOP VALVES.

Fig. 1.

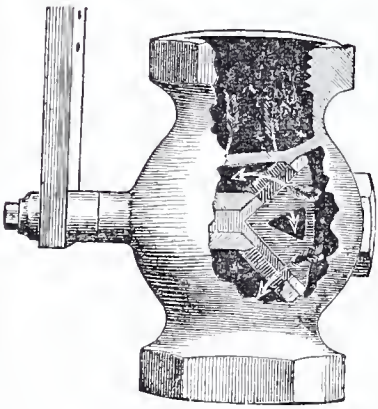
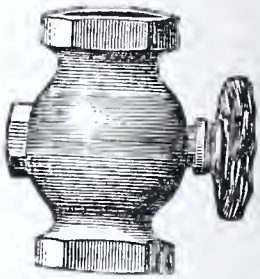


Fig. 2.



Fig, 1 represents the Governor and Chronometer Valve, and Fig. 2 the Stop or Float Valve.

These valves are all made upon the same principle, with a varying arrangement adapting them to the character of service required. The valve and valve seat are turned on an angle of 45 degrees with the axis of the stem of the valve, and are ground to joint when finished. By this form and construction, the joint is not affected by the expansion and contraction of the metal, rendering them as tight when subjected to steam pressure as when cold. The port through the valve being at right angles to its bearing and closing surface, protects them from the ruinous effects of wire drawing in steam or water so detrimental to valves of other constructions. This form of valve seat has a further advantage of requiring no packing around its stem.

These valves are, therefore, less troublesome, more durable, and better adapted to the purposes which they are designed to serve, than any other kind in use.

Fig. 1 represents the CHRONOMETER GOVERNOR VALVE. The ports in this valve are so arranged as to bring the pressure of steam on both sides of it, thereby relieving it of all friction in moving on its seat. And as no packing around the stem or elsewhere is necessary, it is superior for this purpose to any other ever before offered to the public.

Fig. 2 is a STOP VALVE, and is adapted to any purpose for which such are required, either for steam, water, gas or air.

These valves have been used in various parts of the country, for the last twelve years, and have never failed to give entire satisfaction, more especially where a *high pressure of steam* is used.

PRICE LIST.

IRON BODIES.

Chronometer Governor Valve.

¾ inch,	$5 50	2½ inch,	$25 00
1 "	8 00	3 "	35 00
1¼ "	11 00	4 "	60 00
1½ "	15 00	6 "	120 00
2 "	20 00		

Stop Valve.

1 "	$4 00	2½ inch,	$15 00
1¼ "	5 00	3 "	20 00
1½ "	7 50	4 "	35 00
2 " "	11 00	5 "	75 00

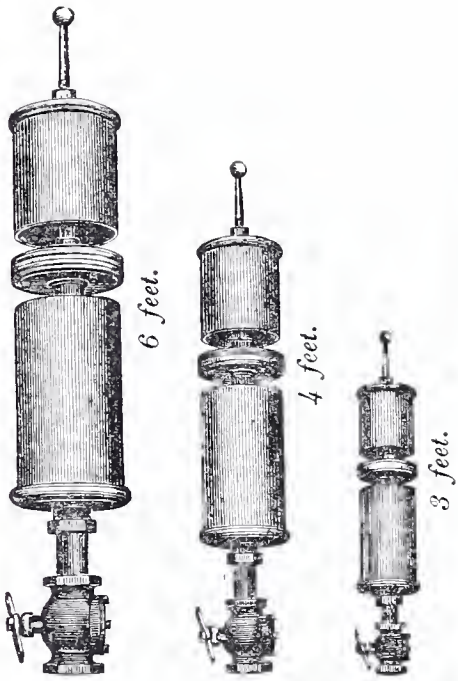
PATENT STEAM GONG.

Fitts' Patent Steam Gong is used for fire alarm and fog signals, and as a call in the manufactory. Six sizes of which are manufactured.

Its construction is novel and peculiar, entirely unlike the ordinary steam whistle. It has two bells in stead of one, as in the steam whistle. These bells are so adjusted and tuned as to produce a musical fifth cord,or with the addition of a third bell a fifth and eighth. This entirely obviates the harsh sound of the whistle, and by following the law of atmospheric harmonic vibration while their tones are soft and pleasant near by, their power of sound is immensely increased. The different sizes are toned to different notes of the musical scale, and by various combination may be varied in pitch to a limited extent. They have been heard thirty miles, thus showing their vast powers of sound. It can be applied to any common boiler, as the quantity of steam required to sound it is trifling.

They have been used by the following parties, as well as by many others:

A. & W. Sprague Man'f Co., Augusta, Me.
Rockland Shoe Co., Rockland, Me.
Fort Scammell, near Portland, Government Fog Signal.
Manchester Locomotive Works, Manchester, N. H.
Nashua Iron Co., Nashua, N. H.
Kilburn & Gates, Burlington, Vt.



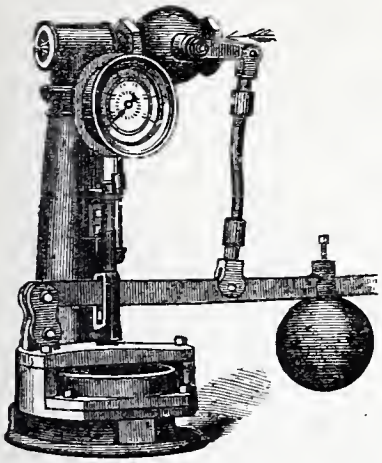
12 inch. *8 inch.* *5 inch.*

H. Belfield & Co., Philadelphia, Pa.
E. H. Ashcroft, Boston.
Brown & Sharpe, Providence, R. I.
Rock Island Water Works, Rock Island, Ill.
C. B. Travis, Natick, Mass.
Rogers & Co., Waterbury, Conn.
Fall River Bleachery, Fall River, Mass.
W. Heywood Chair Co., Fitchburg, Ms.
Brooks Locomotive Works, Dunkirk, New York.
Wason Car Co., Springfield, Mass.
Sheldon & Slasson, West Rutland, Vt.
Tecumseh Mills, Fall River, Mass.
Boyd, Corey, Akl & Co., Marlboro, Mass.
George Houghton, Hudson, Mass.
Clinton Wire Cloth Mfg. Co., Clinton, Ms.
Washburn Iron Works, Worcester, Mass.
Chapin Downes & Co., Providence, R. I.
Colt's Armory, Hartford, Ct.
Willimantic Linen Co., Willimantic, Ct.
Meriden Britannia Works, Meriden, Ct.
Brown & Brothers, Waterbury, Ct.
H. A. Rogers & Co., 54 John St., New York.
Anconia Print Works, Gloucester, N. J.
New Brunswick Hosiery Co., New Brunswick.
Jos & Geo. M. Bullock, Conshohocken, Pa.
Keystone Knitting Co., Philadelphia, Pa.
Kelley, Howell & Ludwig, " "
Chicago and Alton R. R. Co.
James Riddle, Son & Co., Wilmington. Del.
Birdsell Mfg. Co., South Bend, Ind.
O. L. Packard, Milwaukee, Wis.
Shephard, Hall & Co., Ogdensburg, N. Y.
Daniel Smith, Washington, D. C.
Pittston Water Co., Pittston, Pa.
E. & T. Fairbanks, St. Johnsbury, Vt.
Conant Thread Co., Pawtucket, R. I.
Tormney, Stewart & Beck, Atlanta, Ga.
Worswick & Lewis, Cleveland, Ohio.
Sewing Machine Cabinet Co., Indianapolis, Ind.
Studebaker Bros. Wagon Works, South Bend, Ind.
B. S. Nichols & Co., Burlington, Vt.

PRICE INCLUDING VALVE.

5 inch,	$55 00	10 inch,	$100 00
6 "	60 00	12 "	115 00
8 "	75 00	12 " 3 tones harmonized,	150 00

B. Fitts' Steam Pressure Regulator.



PRICE LIST.

$\frac{3}{4}$	inch,	$50 00
1	"	55 00
$1\frac{1}{4}$	"	60 00
$1\frac{1}{2}$	"	75 00
2	"	85 00
$2\frac{1}{2}$	"	100 00
3	"	125 00
4	"	150 00
6	"	200 00

These machines are for reducing the pressure of the steam used in Dressing Rooms, Dye Houses, Slashers, Bleacheries, and on Paper Machines, Heating Coils, etc., to any desired point below the pressure of the steam in the generating boiler, and also serve, when once adjusted, the further desirable and more important purpose of sustaining that pressure at a uniform point. There is a steam gauge attached to each regulator, to enable the operator to know when the weights upon the balance lever are in the proper position, and sufficiently heavy to maintain constantly the desired pressure.

They are especially useful upon the rotary bleach, keeping the pressure uniform, thereby preventing explosion, aiding the uniformity of the bleaching process, and prevent the liquor from flowing back into the steam boilers. By its adjustment the pressure may be increased or diminished at pleasure and maintained where wanted.

When well adjusted their operation is such that whatever may be the pressure in the boiler, a single pound pressure per square inch may be constantly maintained in a coil of pipe beyond the machine.

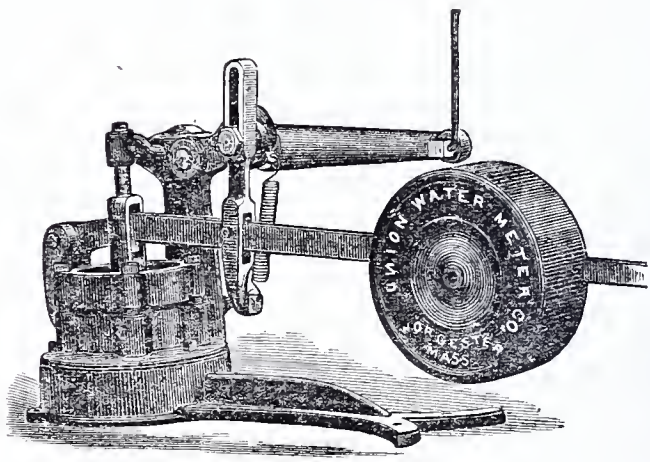
It has been in use ten years since its first introduction. They have been applied among many others upon the following manufactories:

Southworth Mfg. Co., Mittineague.
Agawam Paper Co., "
Agawam Canal Co., "
Worthey Paper Co., "
Byron Weston, Dalton.
Smith Paper Co., Lee.
Chaffee & Hamblin, Lee.
Hurlburt Paper Co., South Lee.
Fitchburg Paper Co., Fitchburg.
Richards & Co., Gardiner, Me.
Cumberland Mills, Portland, Me.

Bates Mfg. Co., Lewiston, Me.
Lewiston Mills, Lewiston, Me.
A. C. Denison, Mechanic Falls, Me.
Amoskeag Mfg. Co., Manchester, N. H.
Stark Mills, " "
Langdon Mfg. Co., " "
Cocheco Print Works, Dover, N. H.
Cocheco Mfg. Co., " "
Salmon Falls Mfg. Co., Salmon Falls, N. H.
Great Falls Mfg. Co., Great Falls, N. H.
Exeter Mfg. Co., Exeter, N. H.

Jackson Mfg, Co., Nashua, N. H.
Nashua Mfg. Co., " "
Lonsdale Mfg. Co., Lonsdale, R. I.
Clinton Mfg. Co., Woonsocket, R. I.
Groton Mfg. Co., " "
Woonsocket Rubber Co., Woonsocket.
Union Wadding Co., Pawtucket. R. I.
Valley Falls Co., Valley Falls, R. I.
Cheney Bros. Silk Mfg. Co., Manchester, Conn.
Platner & Porter Mfg. Co., Unionville, Ct.
East Hartford Mfg. Co., Burnside, Ct.
Hamner & Forbs, " "
Florence Mills, Rockville, Ct.
Pacific Mills, Lawrence, Mass.
Pemberton Mills, " "
Boott Cotton Mills, Lowell, Mass.
Tremont & Suffolk Mfg. Co., Lowell.
Hamilton Mills, Lowell, Mass.
H. R. Barker & Co., " "
Wamsutta Mills, New Bedford, Mass.
Metacomet Mills, Fall River, Mass.
Merchant's Mfg. Co., "
Mechanics Mills, "
Blackstone Mfg. Co., Blackstone, Mass.
Tileston & Hollingworth, Mattapan, Ms.
Thos. Rice, Jr., Newton Lower Falls, Ms.
Dwight Mfg. Co., Chicopee, Mass.
Chicopee Mfg. Co., Chicopee Falls, Mass.
Carew Mfg. Co., South Hadley Falls, Ms.
Hampshire Paper Co., So. Hadley Falls.
Lyman Mills, Holyoke, Mass.
Whiting Paper Co., No. 1, Holyoke, Ms.
" " " " 2, "
Holyoke Paper Co., Holyoke, Mass.
Parson's Paper Co., " "
Crocker Paper Co., " "
Hampton Paper Co., " "
Germania Mills, " "

Damper Regulator.

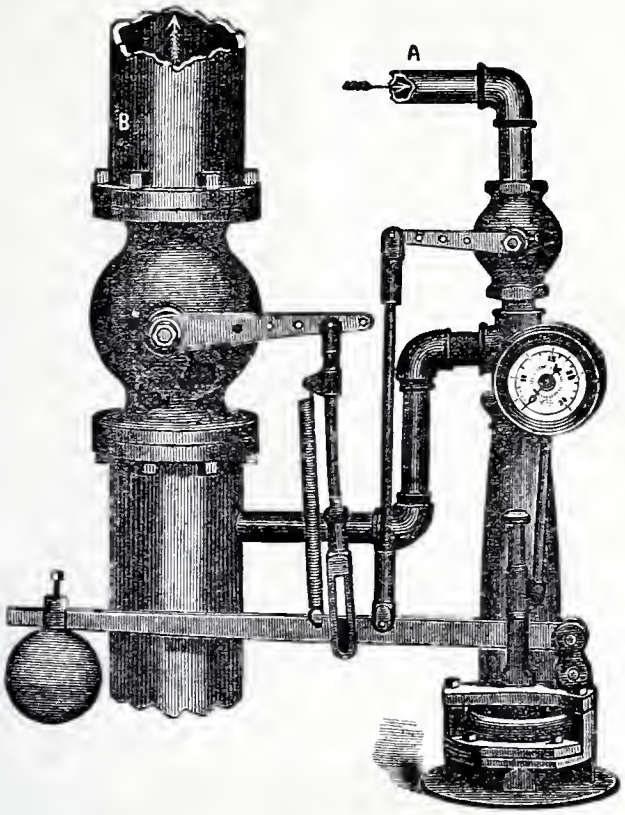


Three sizes of this Regulator are made to be applied to the dampers of large steam chimneys. It regulates the draft to any desired pressure of steam in the boilers. It is so arranged that the damper may be opened or closed at any time by the fireman, independant of its own operations.

PRICE LIST.

No. 1,	$30 00
No. 2,	50 00
No. 3,	100 00

Back Pressure Regulator.



This Regulator is for controling steam in Heating Pipe where exhaust from an engine is used. Its operation is such as to keep the back pressure on the engine uniform at any pressure that may be desired. B represents the exhaust to the air to let off an over pressure. A is a pipe for letting in live steam so as to keep the temperature and pressure uniform in the heating pipes when the engine is not running or the exhaust is insufficient. The Regulator is arranged to control the live steam as well as the exhaust.

PRICE LIST.

2 inch,	$100.	6 inch,	$250.
2½ inch,	125.	8 "	
3 "	150.	10 "	
4 "	200.		

DRINKING FOUNTAIN,

For School-House Yards, Public Streets. &c.

Diameter of Bowl, 2 ft. 4 inches. Total Height 5 ft.

Price $75.00.